RESEARCH PROPOSAL

ANALYSIS OF PUBLISHED INFORMATION
TO EVALUATE THE HEALTH HAZARD
OF POLONIUM INHALED IN TOBACCO SMOKE
(BNPI-207)
to
THE COUNCIL FOR TOBACCO RESEARCH
633 Third Avenue
New York, N.Y. 10017
January, 1967

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Source: https://www.industrydocuments.ucsf.edu/docs/qnnk0000

PROPOSED RESEARCH PROGRAM

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INTRODUCTION

Reports of the presence of ^{210}Po in tobacco and tobacco smoke, as well as in the lungs of tobacco smokers, have led to numerous attempts to label polonium a causative or contributory agent for lung cancer in cigarette smokers. These conclusions were derived in part from calculations of the alpha radiation doses delivered to the lung from inhaled polonium. In many of these cases, these calculations were based on questionable assumptions regarding the biology of inhaled polonium, the anatomy of the lung, the dosimetry of alpha radiation, and the biological effects of alpha irradiation of lung tissue. The possibility that some of the ^{210}Po found in lung may have originated from sources other than tobacco smoke has been largely neglected.

It is important to determine whether the levels of ^{210}Po found in tobacco are great enough to pose a health problem to tobacco smokers, so that counter measures, if necessary, can be taken. To place the question of ^{210}Po in tobacco in its proper perspective requires an objective evaluation of existing data on the levels of ^{210}Po in tobacco, tobacco smoke, and lungs of smokers and nonsmokers relative to the levels of ^{210}Po and other alpha emitters in the body from sources other than tobacco.

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Estimates of the radiation dose delivered to lung tissue from ^{210}Po inhaled in tobacco smoke need to be critically examined and related to experimental results of the effects of inhaled alpha emitters.

This laboratory is uniquely capable of undertaking such an objective evaluation because of its extensive experience in radiation dosimetry and radiological physics gained in support of the programs of the Atomic Energy Commission for more than 20 years. Also, for more than 12 years this laboratory, having completed long and short term studies on a variety of experimental animals, has been active in research on the biological effects of inhaled alpha emitting radionuclides.

PROPOSED RESEARCH

It is proposed to evaluate the significance of polonium in tobacco smoke as a possible hazard to the health of smokers by reviewing and analyzing available published information. This review will be directed towards the following aspects of the problem:

- Levels of ^{210}Po in tobacco and tobacco smoke
- Levels of ^{210}Po in air and other sources that could lead to lung burdens
- Quantities of ^{210}Po that could be deposited in the lung by smoking tobacco
- Levels of polonium and other alpha emitters found in smoker and nonsmoker lungs
- Sites of deposition and pulmonary retention of inhaled polonium
- Radiation dosimetry of inhaled polonium
- Biological effects of lung-deposited alpha emitters.

EXPECTED RESULTS

This review is expected to determine whether ^{210}Po inhaled with tobacco smoke is a pulmonary carcinogen or co-carcinogen. This analysis will identify and define unsolved problems and recommend research which may lead to their solutions.

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Dr. R. C. Hockett
Associate Scientific Director
The Council for Tobacco Research - U.S.A.
633 Third Avenue
New York, N.Y. 10017

Jan. 25, 1967

Dear Doctor Hockett:

RESEARCH PROPOSAL - BNPI-207

We recently forwarded to you four copies of a research proposal, "Analysis of Published Information to Evaluate the Health Hazard of Polonium Inhaled in Tobacco Smoke." On page 2 under "Expected Results" the first sentence needs clarification and should be changed to read, "This review is expected to lead to conclusions regarding the possibility that ^{210}Po inhaled with tobacco smoke may be a pulmonary carcinogen or co-carcinogen."

I would appreciate your making this correction in the four copies of the proposal mailed to you.

Thank you.

Very truly yours,

R S Fawcett for

S. L. Fawcett, Director

WJB:SLF:dd

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BATTELLE NORTHWEST CAPABILITY

For more than 20 years, this laboratory has been concerned with the radiological physics aspects of the atomic energy industry. A highly successful, internationally recognized program was developed for protecting personnel working with radionuclides. Research conducted in this laboratory has contributed significantly to internationally accepted recommendations for safe levels of radionuclides in the environment. Extensive animal experimentation and sophisticated mathematical analyses have yielded major achievements in furthering the understanding of the biological effects of radionuclides in the body and associated radiation dosimetry problems. Part of this effort has been a continuing research program emphasizing the deposition, retention, clearance, translocation, and excretion of inhaled radionuclides, including their short- and long-term biological effects. Early work concerned with the effects of inhaled ^{239}Pu and ^{106}Ru in mice resulted in some of the first lung cancers to be produced by deposition of radioactive particles in the lung. Subsequently, bronchiolo-alveolar carcinoma was demonstrated in dogs after inhalation of ^{239}Pu, an alpha emitter like ^{210}Po. The staff is thoroughly familiar with all aspects of the problems associated with the deposition of radionuclides in the lung. Because of their broad and extensive experience, they are uniquely capable of accurately appraising situations where radionuclides may be inhaled, and are internationally recognized as experts in this field. A list of publications, summarizing our experience in this area, is included in Appendix A.

The scientists to be employed on this study have an extensive knowledge of and access to the pertinent literature. The laboratory's extensive library services provide comprehensive literature searches, the required reference material either from its own voluminous archives of journals, texts and documents or from outside sources, and translation capabilities in nearly all languages.

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DURATION AND FUNDS

Battelle-Northwest proposes to conduct these studies for a period of seven months with a funding of $10,230.

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